Claims

1. Micro-hotplate device with integrated chemical sensor, which comprises:

a) a support substrate;

b) a supported membrane, attached to said support substrate, extending over a well in said support substrate;

c) an island attached to said membrane so as to be electrically and thermally isolated from said substrate, said island consisting at least partly of a semiconducting material;

d) one or several heating elements integrated in said island;

e) one or several temperature-sensing elements integrated in said island;

f) one or several active microelectronic devices integrated in said island, where at least one of said active microelectronic divices is a gas-sensitive field-effect sensor whose chemically active layer is exposed to the ambient.

2. A micro-hotplate device according to claim 1, wherein at least one heating element consists of a heating transistor.

3. A micro-hotplate device according to claim 1, wherein at least one heating element consists of a heating resistor.

4. A micro-hotplate device according to any of the claims 1-3, wherein at least one temperature-sensing element is a temperature-sensitive resistor.

5. A micro-hotplate device according to any of the claims 1-3, wherein at least one temperature-sensing element is a temperature-sensitive diode.

6. A micro-hotplate device according to any of the claims 1-5, wherein said membrane consists of one or several insulator layers.

7. A micro-hotplate device according to claim 6, wherein at least one insulator is silicon nitride.

8. A micro-hotplate device according to claim 6 or 7, wherein electrically conducting leads to the active microelectronic devices on the island have been placed between different insulator layers.

9. A micro-hotplate device according to any of the claims 1-8, wherein the semiconducting material in the island is silicon.

10. A micro-hotplate device according to any of the claims 1-8, wherein the semiconducting material in the island is silicon carbide.

11. A micro-hotplate device according to any of the claims 1-10, wherein the support

steps is an anisotropic tetramethyl ammonium hydroxide etching step.

19. A method according to any of the claims 12-16, at least one of said etching steps is a deep reactive ion etching step.

20. A micro-hotplate device according to any of the claims 1-12, wherein one or several of the chemical sensors utilize the field-effect detection mechanism.

21. A micro-hotplate device according to claim 20, wherein one or several field-effect chemical sensors are combined with one or several chemical sensors that utilize a detection mechanism different from the field effect.

22. A micro-hotplate device according to any of the claims 1-12 or 21, wherein one or several of the chemical sensors are operated as gas sensors.

23. A micro-hotplate device according to claims 21 and 22, wherein one or several field-effect gas sensors are combined with one or several gas sensors that utilize resistance changes as detection mechanism.

24. A micro-hotplate device according to claim 23, wherein at least one of the gas sensors that utilize resistance changes as detection mechanism is made of a semiconducting metal oxide.

25. A micro-hotplate device according to claim 23, wherein at least one of the gas sensors that utilize resistance changes as detection mechanism is made of a polymer.

26. A micro-hotplate device according to any of the claims 1-12 or 20-25, wherein the support substrate contains an array of several islands.

27. A micro-hotplate device according to any of the claims 1-12 or 20-26, wherin the sensor is exposed to the ambient through a hole in the membrane.
